What Role Will Technology Play in the Future of Law Enforcement Firearms Training Facilities? The Future of Realistic Training

by

William Stuart
Huntington Beach Police Department

May, 2008

COMMAND COLLEGE CLASS 42

The Command College Futures Study Project is a FUTURES study of a particular emerging issue of relevance to law enforcement. Its purpose is NOT to predict the future; rather, to project a variety of possible scenarios useful for strategic planning in anticipation of the emerging landscape facing policing organizations.

This journal article was created using the futures forecasting process of Command College and its outcomes. Defining the future differs from analyzing the past, because it has not yet happened. In this article, methodologies have been used to discern useful alternatives to enhance the success of planners and leaders in their response to a range of possible future environments.

Managing the future means influencing it—creating, constraining and adapting to emerging trends and events in a way that optimizes the opportunities and minimizes the threats of relevance to the profession.

The views and conclusions expressed in the Command College Futures Project and journal article are those of the author, and are not necessarily those of the CA Commission on Peace Officer Standards and Training (POST).

What role will technology play in the future of Law Enforcement firearms training facilities?
The Future of Realistic Training

Law enforcement firearms training has come a long way since its humble beginnings in the New York City Police Department around 1895, at the direction of then commissioner Theodore Roosevelt (Morris 1999). Commissioner Roosevelt required the US Calvary standard of only 15 to 20 shots fired twice annually, with more training for those who demonstrated inferior marksmanship scores (O'Connor, 2005).

Early police firearms training facilities consisted of little more than a remote area where targets could be placed in a mounting system and officers could fire from various distances into a dirt berm to prevent bullets from traveling great distances downrange and striking unintended targets. Today, police firearms training facilities incorporate varying degrees of technology to recreate the realism of actual armed encounters experienced by officers on the street. William Murphy of Firearms Training Associates in Corona, California says realism in training is the single most important aspect of a comprehensive contemporary firearms training program. (Murphy, 2008).

Let's take a look at existing technology being used in law enforcement firearms training and explore some exciting possibilities of where it may lead. With the growth of computer technology accelerating at a rapid pace, what effect might that have on how we conduct weapons training? Is it possible that targets could become more realistic and interactive? Could emerging technology supplant the need to conduct live fire training completely? What effect will the funding provided by the Pentagon for simulator development have on firearms training? Why is a transition to technology-based

solutions so critical for the future of officer safety? These are some of the issues we will examine with an eye toward improved realism through technology.

What type of training do we currently present and what technology do we use?

There are some amazing applications of current technology that serve as harbingers of an exciting future for firearms training and its host facilities. The following examination of current technology may help define your view of the future and allow the requisite planning for your agency to provide top flight firearms training.

Existing simulator technologies have proven themselves to have a number of advantages over live fire facilities. Simulators allow for more practice at less cost, the training can be individually tailored to meet instructional purposes; trainees are provided the opportunity to make mistakes that would be unacceptable in the real world and training can be provided in areas and at times where the noise from a conventional firearms training facility would be disturbing (Bennell, et al., 2005).

Because the type of firearms training dramatically affects the form and function of the training venue, it is virtually impossible to discuss firearms training facilities without an examination of the training to be conducted in those facilities. According to US Marine Captain Michael McDowell, Weapons and Field Training Battalion, Commander in San Diego, the Marine Corps designs its firearms training facilities by first establishing the desired field performance. They then design training to ensure that performance, and then work backwards to design facilities to support the envisioned training (McDowell 2007).

What began as exclusively marksmanship and safety training has become a much more comprehensive training endeavor encompassing a wide variety of skills under the umbrella of firearms training. Use of force, decision making, tactics, teamwork and gun fighting skills are currently recognized as important areas for any law enforcement firearms training program to address according to William Murphy of Firearms Training Associates (Murphy, 2008). All of these have dramatically added to the complexity of a law enforcement firearms training program, as well as the physical requirements of the venue to provide the training.

The Police Policies Studies Council (PPSC) is a diverse group of professionals constituting a research-based interdisciplinary, training and consultation corporation with a training facility in New Mexico. PPSC staff members, consist of a diverse group of professional criminal justice trainers and practitioners from all over the country specializing in the comprehensive study of the police use of deadly force. According to Thomas Aveni, a long time police trainer and staff member of the P.P.S.C., the predominant approach to police firearms training is to make the training as realistic as possible through the use of scenario based training and role playing to emphasize decision making related to the use of force (Aveni, 2002). It is currently the consensus among police trainers that training related to deadly force must incorporate as much information as possible from real-life situations. Officers need to face the situations and environments that provide the biggest challenge to them on the street to most effectively prepare them for a deadly force encounter, according to the Law Enforcement News published by John Jay College of Criminal Justice (Law Enforcement News, 2004).

With an intense focus on realism and elements that reduce decision-making efficiency, contemporary comprehensive programs incorporate a number of different elements into firearms training. Effective programs augment traditional marksmanship training with motion, movement, noise, reduced light, decision making under stress, vehicle use and any other accoutrement that makes the training more like a real life deadly force encounter (Law Enforcement News, 2004). Effective programs also take steps to add the critical element of intense stress produced in a gun fighting scenario where your adversary will shoot back at you if afforded the opportunity.

Murphy says a comprehensive contemporary firearms training program should include the following:

- Scenario based training
- Decision making process more involved than "shoot--don't shoot" that includes a wide range of force options where use of firearms may not be the appropriate response
- Includes less lethal options as part of decision making process
- Conducts marksmanship training and scenarios in reduced light
- Uses vehicles and other props commonly involved in applications of deadly force by firearm
- Emphasizes teamwork and tactics to possibly prevent the need for shooting
- Incorporates both suspect and officer movement
- Immediate debrief with performance feedback from trainers—video playback of scenario so officers can see their own performance is often very effective

- Scenarios that incorporate different sized teams of officers and demand increased level of interaction to address "bunch shootings"
- Gun fighting skills through use of simunitions, paintball guns etc. (Murphy, 2008).

To understand the advancement in realism of firearms training, it is important to explain in greater detail what their capabilities are and how they work. While stationary paper targets are still the standard for many programs, there are much more realistic technologies available. Even enhanced paper target systems with multiple rows of targets that allow for lateral movement and turning in many different combinations are dramatic improvements over a stationary paper target. These systems allow for increased decision making pressure applied to the shooters. Anything we can do to add decision making stress to the training scenario will make our officers more effective and enhance public and officer safety (Murphy, 2008).

The use of interactive steel targets has been around for some time. According to information from Action Target, one of the largest and most progressive firearms range builders and suppliers, "Shooting on steel targets is the most effective and most efficient way to practice, regardless of your experience or skill level" (www.topratedadventures.com/Mfg/**ActionTarget**.htm). Steel targets add immediate feedback to the shooter with an audible report or movement of the target providing input for the shooter to process and react to as they would in a real life situation.

What really adds realism however, is a 3-dimensional target with some kind of interactive response. The "Mad Robot" target adds realism by presenting a realistic looking human target in the form of a mannequin combined with being mounted on a

robotic chassis that is remote controlled and can be directed in ways that simulate human movement. According to the manufacturer, United Service Associates, Inc., this combination of realistic looking 3-dimensional targets and the ability to move the target on any angle, at any speed, allows the flexibility to tailor your training to incorporate decision making, tactics and teamwork as well as basic marksmanship and gun handling skills (http://www.usasmog.com/madrobot/madrobot1.htm).

The use of this type of target technology is a very inexpensive way to increase the realism of the training experience. This technology represents a very cost effective way to increase your officer's decision making effectiveness.

Offering similar advantages with realism and reactivity is the "Hard Head Ted" target offered by DVC Targets. This target lacks movement but offers a high degree of response to being struck in appropriate locations. According to Tom Givens, Chief instructor and rangemaster at Memphis, Tennessee Police Department, "By changing props and clothing, we can configure shoot/no-shoot and even personal recognition problems into a scenario" (http://www.dvctargets.com/). This target falls backwards only when hit with shots that strike the head or center of the chest area. This provides the shooter with immediate feedback indicating the firing of likely fatal or immediately debilitating shots. This technology is very cost effective while providing students with

very realistic targets and feedback which will likely enhance their decision making and accuracy.

Current Technology

While these target systems clearly take the mechanical approach to firearms training by using live fire, there is a competing technology that takes an entirely different approach. Computer driven simulators are an increasingly viable alternative to live fire that has increased in both realism and flexibility in recent years. You likely remember your first experience with an ICAT or FATS system. While it introduced the concept of using scenario based training, it also lacked realism in many regards. The scenarios quickly became known to the students because they were limited in number and the weapons lacked any realistic feedback to the shooter in the form of sound or recoil.

The current generation of simulators has matured into a highly evolved platform through which not only firearms use, but a diverse and inclusive range of use of force responses can be taught and evaluated (Bennell et al., 2005). Simulators now offer more realistic scenarios than ever before along with increased realism incorporated into the weapons used which provide tactile feedback and can be programmed to malfunction by the instructor. According to Greg Block, Owner of Self-Defense Firearms Training, the latest generation of simulators uses High Definition Video footage for the video scenarios. He has used a system called PRISim (Professional Range Instruction Simulator) manufactured by Advanced Interactive Systems for a number of years. According to Block, the technology related to his system is advancing so rapidly, he installs software and hardware upgrades every twelve months. With each upgrade, the system increases in quality and versatility. Block told me the system he uses today does

not even remotely resemble the simulator system he began using in the early 1980's. "That original system was very rudimentary and was strictly a shoot-don't shoot mechanism. Systems today allow officers to use any force option available to them in the real world during one of my scenarios. They are not limited to just firearms but can use batons, pepper spray, tasers, very realistic handguns or shotguns" (Block, 2008).

We have seen two distinctly different approaches to firearms training: 1) using real firearms and applying enhanced technology to increase realism through improved targets, lighting etc., or 2) advanced simulation technology integrating firearms training as one element of overall use of force training. With both approaches competing for market share, which one is likely to prevail in the future?

The Future of Advanced Firearms Training

Laser Shot Inc. of Stafford, Texas, appears to be more advanced with their approach of a training facility that will allow a combination of dry-fire scenario training in a simulator environment, use of laser based weapons and culminate with live-fire exercises all in the same scenario based simulator environment. This approach combines the best of all options using real live fire weapons in a simulator controlled environment that allows for video replay of officers actions, hits and decision making (http://www.lasershot-lawenforcement.com/). This approach bridges the gap between pure simulation and pure live fire with real weapons. Using this approach has a number of advantages including increased versatility by providing the ability to use simulated and the officer's actual live fire duty weapons; as well as all the advantages attributed to an

electronic simulator environment. With experts in both camps, what may lead us in one direction instead of the other?

In his 2005 report entitled "The Effectiveness of Use of Force Simulation Training Final Report", Dr. Craig Bennell of Carleton University in Ottowa, Canada noted, "Unlike earlier use of force instructional methods, such as range shooting, simulators are designed to provide more realistic training and to cover a broader range of use of force options. This latter approach accepts that mastering specific skills is a crucial component of any training regime, but the ability to apply those skills appropriately under stressful (i.e., sub-optimal) conditions is viewed as equally critical" (Bennell et al. 2005). Bennell goes on to state, "Objectively, simulation training has been demonstrated to increase the number of preventative actions taken by police officers, enhance shooting accuracy, reduce the number of shots fired to achieve an objective, increase the degree to which police officers use cover, and decrease the number of unjustified shootings" (Bennell et al. 2005). The real value in simulation based use of force training is the ability to allow the use of force training to go beyond the point of simply mastering specific skills and focus on teaching the appropriate application of these skills under realistic field conditions (Bennell et al. 2005).

Both firearms training experts William Murphy and Greg Block agree with Dr. Bennell that mastering specific skills is crucial. Both believe it is unlikely that simulators will ever totally supplant live fire instruction when teaching basic marksmanship or other basic individual skills (Murphy, Block, 2008). The significance of this perception is that there will always be the need to shoot the actual duty weapons carried by the officers to some extent. Similarly, teaching arrest and control techniques, the use of chemical

weapons, tasers and gun fighting as individual skills will likely continue into the foreseeable future.

The United States Marine Corps teaches recruits basic marksmanship on conventional ranges before ultimately transitioning to the use of various types of simulators and a variety of team exercises. They use a variety of mock environments to add decision making skills, realism and to raise the anxiety level of the students to more closely simulate battlefield conditions (McDowell, 2007). This training evolution is an example of Dr. Bennell's observations regarding the capability of simulators to provide the environment to meld critical skills in a realistic simulated environment.

The Future of Simulation

Holographic Images

With a number of companies developing new technologies that allow holographic, three-dimensional images to be used for marketing purposes all competing for market share, it is likely current limitations on size and interactivity will be overcome.

Companies like Holophile, Inc. who make custom holographic media for marketing, are continuing to expand the abilities of a "Spectral Imagery" technique, according to company President Paul Barefoot. Spectral Imagery allows small three-dimensional images to appear on a set with real props and actually interact with them (http://www.holophile.com/spectral.htm, 2008). While currently the images produced using this technology are not interactive, that would appear to be the logical next step in its development.

Improved Graphics and Virtual Humans

Anyone who has teenage children has likely seen them play video games similar to Halo 3 or Call of Duty 4. The HD graphics and movement are astounding and have steadily improved with each new game. This improvement is driven by the quest to achieve improved realism. The gaming industry is very competitive, and each company is constantly striving to produce a product superior to their competitors. This competition drives improved realism and added functionality with each new generation of games.

According to firearms instructor Greg Block, improvements in firearms simulators are currently being driven by the gaming industry. He points out the law enforcement and military simulation market represents only a fraction of the gaming industry market (see www.americasarmy.com for a 9-million subscriber program funded by the Army). In fact, the military sector has steadily grown as a result of our current involvement in Iraq and Afghanistan leaving domestic law enforcement as the smallest portion of the market (Block, 2008). Block attends the Interservice Industry Training, Simulation and Education Conference (I/ITSEC) each year. Leading vendors such as Lockheed Martin, Northrop Grumman and L3, who manufacture the largest and most technologically advanced simulation systems, are some of the most noteworthy vendors with a presence at the event. Many of these training simulation manufacturers are seeking to maximize the capability of their products for law enforcement and military related training by using the same innovations as video game technology.

With this tie-in between the simulator and gaming worlds, Block sees a transition coming from using video to using Computer Generated Images (CGI) (Block, 2008). In a 2007 paper entitled, “Building Interactive Virtual Humans for Training Environments”

written by the Institute for Creative Technologies (ICT) at the University of Southern California, the authors address their goal of developing "virtual humans" capable of realistic interaction with humans using emotions attached to behaviors. They note that their goals are much the same as the game and film entertainment industry, creating believable virtual humans. "Though these industries are not noted for their research, they are known for trying new and creative ideas, especially in trying to create very realistic looking characters" (Kenny et al., 2007). This statement certainly supports the observation made regarding the link between the gaming industry and available simulator technology by firearms trainer, Greg Block.

The ICT has constructed working prototypes in a variety of configurations including a "Cultural and Cognitive Combat Immersive Trainer", which "places soldiers in critical decision making situations that are highly realistic and require cultural awareness to make the best judgments" (Kenny et al., 2007). This highly sophisticated use of computer generated graphics and behavior modeling certainly appears to be similar to scenarios likely to aid law enforcement in use of force firearms training.

The ICT has also tested virtual human training prototypes with the military placing soldiers in scenarios involving investigative questioning as well as tactics with a great degree of success and positive feedback from participants at Fort Benning, Georgia (Kenny et al., 2007).

Virtual Reality

Virtual reality is nothing new. Going back over a decade we have all seen it depicted in movies such as “Total Recall” (1990) where Arnold Schwarzenegger goes on a virtual vacation. According to Defense Review.com, “a company called VirtuSphere, Inc. (Sammamish, WA) has a product which provides a rather unique Mil/LE tactical training and simulation experience. Due to its design, the VirtuSphere provides "infinite space" and claims to also provide "the most immersive [virtual reality a.k.a. "VR"] experience for simulated training, exercise and gaming." The VirtuSphere platform consists of a large hollow sphere that can rotate 360 degrees as the user walks, runs, somersaults, etc. inside it while wearing a wireless, head-mounted VR (virtual reality) display a.k.a. wireless VR headset” (Defense Review.com, 2007).

Defense Review.com also reviewed a virtual reality and simulator system called Virtual Interactive Combat Environment (V.I.C.E.) made by Dynamic Animation Systems, Inc. (DAS). The system “allows multiple members in a military Special Operations unit or law enforcement SWAT team (or 1st Responder) to train simultaneously (in separate/individual V.I.C.E. Student Stations with untethered "replica M4 weapons") in a dynamic virtual tactical environment.” V.I.C.E. allows students to choose where they want to go in the virtual environment, which is also controlled to a degree by instructors who monitor the scenarios and can interact with the immersed trainees by exploiting observed weaknesses. For example: Let's say a Military Spec-

Operator or LE SWAT operator isn't doing what he's supposed to be doing during a virtual operation, and he forgets to clear an area or check his six. The instructor can see what he's doing wrong and can control the opposing force in such a way that one of the bad guys sneaks up on the operator from behind and shoots him dead (Defense Review.com, 2006).

The implications of combining the technologies of VirtuSphere and V.I.C.E. represent a significant potential advancement in simulator technology. This approach could offer significant advantages in law enforcement firearms training. Increased skill in the appropriate application of force through more effective decision making is the greatest benefit realistic simulator training offers. The outcome of improved decision making and firearms skill will enhance safety for officers and citizens. Better decision making will prevent many incidents from escalating into a shooting and with increased firearms skills, when a shooting does occur, it will end quickly with fewer shots fired.

Conclusions and the Future

In the early stages of firearms training, there is likely no replacement for the actual use and manipulation of real weapons. While simulated weapons have an ever increasing degree of realism by providing recoil, requiring reloading and the clearing of malfunctions, the civil liability that could be created by training with exclusively simulated weapons is likely unacceptable to most agencies. As with many other rapidly emerging technologies, there may be significant lag time between the availability of the technology and its acceptance by the legal community.

Most agencies go to great lengths to ensure each officer is carrying their issued weapon and departmentally-approved and issued ammunition to limit civil liability in

shooting cases. Can you imagine the perceived increased exposure to an agency with an officer who accidentally shoots an innocent bystander and testifies later in civil court that he has never actually shot the gun he was using the day of the shooting?

While flight simulators are an essential component of a commercial pilot's training, passengers would most certainly balk if the pilot had never actually experienced flight before embarking with him at the controls on their next flight. Society and the courts are likely to feel the same anxiety related to firearms training for some time into the future. Existing simulator technologies have proven themselves to have a number of advantages over live fire facilities; they allow for more practice at less cost, the training can be individually tailored to meet instructional purposes; trainees are provided the opportunity to make mistakes that would be unacceptable in the real world and training can be provided in areas and at times where the noise from a conventional firearms training facility would be disturbing (Bennell, et al., 2005). If both holographic technology and the building of virtual humans are implemented in the future, they would offer a degree of sophistication and realism that could rival the actual experience in the real world. All of this will become integral to firearms training, but not as a full replacement to the reality of firing a weapon to complete the trainee's understanding of their task.

Law Enforcement firearms training facilities of the future will likely consist of a hybrid application of all the technologies discussed herein. They will require less space, focus on interactivity and be able to recreate real life more accurately than we can imagine. The amount of actual live-fire training will greatly diminish over time as simulator technology proves itself to be far superior. It will offer law enforcement an opportunity to focus not only on individual weapons skills, but on skillful tactics and

most importantly, decision making in the global context of use of force. This technology will not come cheaply, though.

While the cost of new technology is difficult to estimate, it is not difficult to envision costs that would outpace the ability of many to fund the purchase and support of such a system. A viable solution could be regionalization of firearms training through a cooperative effort involving a number of agencies contributing to the funding and overall training effort. Many agencies currently partner with each other to provide narcotics enforcement, traffic enforcement, DUI checkpoints and K9 training to name a few. There is no reason the same approach to funding and operating a simulator based firearms training program would not be successful. After all, isn't team work what law enforcement is all about?

References

Action Target Website (2008), www.topratedadventures.com/Mfg/ActionTarget.htm

Aveni, Thomas J. (2002). The Handgun Qualification Trap. *The Police Policy Studies Council*.

Bennell, Craig Ph.D., Jones, Natalie J. (2005). The Effectiveness of Use of Force Simulation Training Final Report, *Psychology Department, Carleton University, Ottowa, Canada*

Block, Greg (2008). Interview with Owner and Chief Trainer of Self-Defense Firearms Training, Huntington Beach, California.

Defense Review (2007.). Quick Hits 3 from SHOT Show 2006: And the Hits Keep Comin', http://www.defensereview.com/modules.php?name=News&file=article&sid=844

Defense Review (2007). VirtuSphere Virtual-Reality Simulator for Mil/LE Tactical Training, http://defensereview.com/modules.php?name=News&file=article&sid=917

DVC Targets (2008). Promoting Realism and Excellence in Combative Shooting, http://www.dvctargets.com/

Holophile (2008). Marketing and Communications Company, http://www.holophile.com/

Laser Shot Inc. (2008). Firearms Training Systems, http://www.lasershot.com/

Law Enforcement News (2004), Experts Say Firearms Training Needs to Come Out of the Dark, *Law Enforcement News, Vol. XXX, No. 625, A Publication of John Jay College of Criminal Justice/CUNY,* http://www.theppsc.org/News/Experts.Say.Firearms.Training.Needs.To.Come.Out.of.the.Dark.htm

McDowell, Michael Captain, USMC Company Commander of the Marksmanship Training Company, Weapons and Field Training Battalion, Marine Corps Recruiting Depot, San Diego, (2007), Interview, San Clemente, California.

Morris, Cynthia (1999), The Role of Police in American Society, Greenwood Press, Westport, Ct.

Murphy, William (2008), Owner and Chief Instructor, Firearms Training Associates, Yorba Linda, California.

O'Connor, Dr. Tom (2005), Police Gunfighting, *North Carolina Wesleyan College Class Lecture*, http://faculty.ncwc.edu/mstevens/205/205lect02a.htm.

United Service Associates Inc. (2008), Mad Robot Remote Controlled Target, http://www.usasmog.com/madrobot/madrobot1.htm